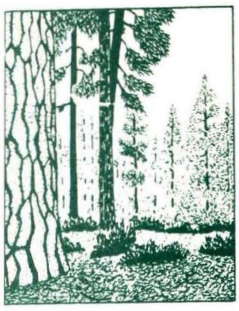

FOREST RESEARCH NOTES

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
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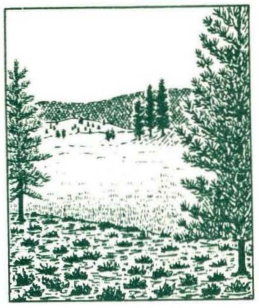

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EFFECT OF FERTILIZER ON CONE PRODUCTION OF SUGAR PINE

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Fertilizing seed trees may be one way to improve reforestation of cut-over and fire-destroyed timber stands in California. One of the chief difficulties in reforestation here is that most of the commercial conifers do not produce good crops of seed-bearing cones often enough. Heavy crops have been as much as 7 years apart. As a result an adequate supply of seed for natural regeneration seldom occurs at the right time on cut-over areas. If artificial regeneration is relied on for new timber crops, tree planters have to collect and store large quantities of seed during the few good years to tide them over the many poor ones. Heavier crops at shorter intervals would help solve a good many of these problems. That this objective may be reached through fertilization is shown by a preliminary test the Experiment Station recently completed with applications of ammonium phosphate around sugar pines.

The Study

In the spring of 1951, 8 pairs of dominant sugar pines ranging from 27 to 52 inches in diameter (table 1) were selected. Half were treated with 100 pounds of ammonium phosphate (16-20-0) per tree. The fertilizer was spread on the ground beneath each tree over an area equivalent to the crown spread. The treatments were repeated in the spring of 1952 and 1953.

The trees selected for this study were on a part of the Stanislaus Experimental Forest which had been logged in 1948. All seed trees selected had been released and though all trees were not released to the same degree, the differences were considered too small to bias this exploratory study.

Results

Since sugar pine cones require 2 years to mature, no effect of the fertilizer was expected until 1953. None of the trees bore cones in 1951. In 1952, 4 of the fertilized trees bore more cones than their unfertilized counterparts and 4 had less cones. Of the 2,073 cones

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produced on the fertilized trees, 848 cones were borne on one tree (fig. 1, table 2). The average for the 7 remaining fertilized trees was 175 cones, compared to 181 for the 8 untreated trees. Thus, the fertilized and unfertilized seed trees were similar in cone-producing capacity.

During the 4-year period, 1953-6, when the fertilizer may have had an effect on cone production, the fertilized trees produced nearly three times as many cones as the unfertilized trees. Seven of the eight fertilized trees bore more cones than their unfertilized controls.

Although the study indicated that fertilization with ammonium phosphate will increase sugar pine cone production, further study will be required before general recommendations can be made.

Table 1.--Diameter and Dunning tree class of sugar pine seed trees, Stanislaus Experimental Forest, 1951

Treatment and tree number	D.b.h.	Dunning tree class
	Inches	
Fertilized:		
1	48.5	5
2	30.3	1
3	32.8	1
4	39.2	1
5	40.2	1
6	45.8	3
7	52.3	5
8	27.0	1
Unfertilized:		
1	48.8	5
2	27.9	1
3	33.4	1
4	38.4	1
5	38.8	1
6	50.3	3
7	52.0	5
8	26.7	1

Figure 1.--A 48-inch d.b.h. sugar pine bearing an estimated 848 cones in 1952 on the Stanislaus Experimental Forest. (Fertilized tree No. 1).

Table 2.--Cones produced on fertilized and unfertilized sugar pine seed trees, Stanislaus Experimental Forest, 1951-1956

Treatment and tree number	1951	1952	1953	1954	1955	1956	Total 1953-6
	- - - - - - - - - - - Number - - - - - - - - - - -						
Fertilized:							
1	0	848	13	48	131	762	954
2	0	104	10	89	2	64	165
3	0	12	53	74	0	4	131
4	0	156	3	128	1	8	140
5	0	158	0	122	2	154	278
6	0	398	17	145	26	52	240
7	0	321	4	313	0	340	657
8	0	76	0	64	0	69	133
Total	0	2,073	100	983	162	1,453	2,698
Unfertilized:							
1	0	309	3	9	0	70	82
2	0	72	2	23	0	14	39
3	0	152	3	34	0	14	51
4	0	160	10	46	0	165	221
5	0	185	3	182	1	73	259
6	0	9	26	2	0	5	33
7	0	273	3	26	0	161	190
8	0	106	4	15	0	10	29
Total	0	1,266	54	337	1	512	904